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(54) **Disposable diaper**

Wegwerfwindel

Couche-culotte jetable

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(56) References cited:  
**EP-A- 0 601 610** **EP-A- 0 761 194**  
**EP-A- 0 763 353** **GB-A- 2 284 741**  
**US-A- 5 593 400**

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## Description

[0001] This invention relates to a disposable diaper for absorbing and containing body exudates.

[0002] Japanese Utility Model Application Disclosure Gazette (Kokai) No. Hei3-122824 discloses an absorbent garment comprising a stretchable topsheet, a stretchable backsheet and a water-absorbent panel disposed between these two sheets, wherein the topsheet and the panel are bonded to each other at a plurality of dots.

[0003] However, this known garment is disadvantageous in that the topsheet has its intrinsic stretchability remarkably lessened in its region bonded to the panel and can offer its intrinsic stretchability only in its region extending outwards beyond a peripheral edge of the panel. Consequently, a stretchability of the topsheet which can be utilized during practical use of the garment will be no more than the stretchability offered by an extremely limited portion of the topsheet in spite of intentionally using both the topsheet and the backsheet which are entirely stretchable. Generally, a stretchable sheet is relatively expensive and therefore a noticeable cost performance can not be expected so far as the stretchable sheet is used in the manner of the above-mentioned prior art.

[0004] In view of the problem as has been mentioned above, it is an object of the invention to provide a disposable diaper so improved that a sheet as an important member of the diaper and having a stretchability in a vertical direction of the diaper can be efficiently stretched.

[0005] According to the invention, there is provided a disposable diaper basically comprising a briefs-type cover component having a front a waist region, a rear waist region and a crotch region extending between these two waist regions so as to form a waist-opening and a pair of leg-openings, and an absorbent component formed separately of the cover component, the absorbent component comprising a liquid-pervious topsheet, a liquid-imperious backsheet and a liquid-absorbent core disposed therebetween, and the absorbent component longitudinally extending on an inner side of the cover component from the crotch region into the front and rear waist regions.

[0006] This disposable diaper is characterized by that: the cover component is elastically stretchable in a vertical direction of the diaper; absorbent component is not elastically stretchable in a vertical direction and connected to an inner surface of the cover component in the proximity of the waist-opening in the front and rear waist regions by suspender sheets which are not elastically stretchable in the vertical direction; and the suspender sheets are respectively formed with pleats which extend circumferentially of the waist regions and can be flatten out in the vertical direction.

Fig. 1 is a perspective view showing a disposable

diaper according to the invention as partially broken away;

Fig. 2 is a sectional view taken along a line II-II in Fig. 1;

Fig. 3 is a plan view showing the diaper of Fig. 1 as front and rear waist regions are separated from each other along their transversely opposite side edges and then flattened out with an inside of the diaper facing upwards, as partially broken away;

Fig. 4 is a view similar to Fig. 2 showing a specific embodiment of the invention; and

Fig. 5 is a view similar to Fig. 3 showing the specific embodiment of the invention.

[0007] Details of a disposable diaper according to the invention will be more fully understood from the description given hereunder with reference to the accompanying drawings.

[0008] Disposable diaper 1 shown by Fig. 1 in a perspective view as partially broken away generally consists of a briefs-type cover component 2 and an absorbent component 3 attached to an inner side of the cover component 2.

[0009] The cover component 2 comprises a front waist region 6, a rear waist region 7 and a crotch region 8 extending between these two waist regions 6, 7 so as to define a waist-opening 10 and a pair of leg-openings 12. The front and rear waist regions 6, 7 are placed flat together along their transversely opposite side edges and joined to each other at a plurality of joining zones 13 intermittently arranged in a vertical direction along each side edge. The waist-opening 10 is provided with an elastic member 14 circumferentially extending under appropriate tension.

[0010] Fig. 2 is a sectional view taken along a line II-II in Fig. 1 and Fig. 3 is a plan view showing the diaper 1 of Fig. 1 as the front and rear waist regions 6, 7 are separated from each other along the joining zones 13 and flattened out with an inside of the diaper 1 facing upwards, as partially broken away. The cover component 2 is hourglass-shaped and basically made of an elastic sheet 21 which is stretchable in a vertical direction of the diaper 1. The cover component 2 further includes a pair of suspender sheets 22A, 22B which are not stretchable in a vertical direction of the diaper 1 and respectively attached to inner surfaces of the front and rear waist regions 6, 7 along peripheral edges of the waist-opening. These suspender sheets 22A, 22B are used to connect the absorbent component 3 to the cover component 2 and extend in parallel to a center line C-C dividing a longitudinal dimension of the diaper 1 in two. The suspender sheets 22A, 22B are folded along first folding lines 23A, 23B lying relatively near the center line C-C and along second folding lines 24A, 24B lying relatively remote from the center line C-C to form pleats presenting Z- and inverted Z-shaped cross-sections, respectively. The suspender sheets 22A, 22B are joined to the inner surface of the cover component 2 along the

peripheral edges 11 of the waist-opening 10 and the transversely opposite side edges 13 by means of hot melt adhesive 46 indicated by a plurality of dots so as to form relatively deformable pleats 26A, 26B on the sides of these suspender sheets 22A, 22B opposed to the center line C-C, respectively. The elastic member 14 circumferentially extending is secured, under appropriate tension, to the inner surface of the cover component 2 along the peripheral edges 11 of the waist-opening 10 and covered with the suspender sheets 22A, 22B. It is also possible to dimension these suspender sheets 22A, 22B so that they are narrower than a width of the diaper 1 and larger than a width of the absorbent component 3. In this case, the suspender sheets 22A, 22B may be joined to the cover component 2 along the peripheral edges 11 of the waist-opening 10 alone.

[0011] The absorbent component 3 has a rectangular shape longitudinally larger as seen in Fig. 3 and comprises a liquid-pervious topsheet 31, a liquid-impervious backsheet 32 and a liquid-absorbent core 33 disposed between these two sheets 31, 32. The rectangular shape is defined by longitudinally opposite ends 36, 37 extending transversely of the cover component 2 and transversely opposite side edges 38, 38 extending longitudinally of the cover component 2. The topsheet 31 and the backsheet 32 which are not elastically stretchable extend outwards beyond peripheral edges of the core 33 and are bonded to each other along such extensions by means of hot melt adhesive 43. The absorbent component 3 is provided along its transversely opposite side edges with elastically stretchable members 41, 41 longitudinally extending between the topsheet 31 and the backsheet 32 and secured to at least one of these sheets 31, 32. The longitudinally opposite ends 36, 37 of the absorbent component 3 have their outer surfaces bonded to the pleats 26A, 26B of the suspender sheets 22A, 22B on their inner surfaces, respectively, by means of hot melt adhesive 42. The core 33 is formed by fluff pulp fibers or a mixture of fluff pulp fibers and superabsorptive polymer particles and neither stretchable nor contractible.

[0012] After the diaper 1 of such arrangement has been put on a wearer's body, the sheet 21 is elastically stretched upwards and thereby the pleats of the suspender sheets 22A, 22B are flattened out as the cover component 2 is pulled upwards. Dimensions between the first and second folding lines 23A and 24A; 23B and 24B of the respective suspender sheets 22A, 22B in a vertical direction of the diaper 1 may be appropriately selected to ensure that stretching of the elastic sheet 21 should not be restricted.

[0013] Figs. 4 and 5 are views similar to Figs. 2 and 3, respectively, showing a specific embodiment of the invention. Of this diaper 1, the cover component 2 comprises a first elastic sheet 21 and a second elastic sheet 30 placed upon the inner surface of the first elastic sheet 21. These first and second elastic sheets 21, 30 identical in shape and size are elastically stretchable in a vertical

direction of the diaper 1. Along the peripheral edges 11 of the waist-opening 10 and the transversely opposite side edges of the crotch region 8 in the cover component 2, elastically stretchable members 14, 29 extend circumferentially of a wearer's waist and legs, respectively, between the first and second sheets 21, 30, to at least one of which these elastic members 14, 29 are secured. The first and second elastic sheets 21, 30 are bonded to each other by means of hot melt adhesive (not shown) intermittently distributed to avoid that each of these two elastic sheets 21, 30 might restrict stretchability as well as contractibility of the other elastic sheet 21 or 30.

[0014] The topsheet 31 and the backsheet 32 of the absorbent component 3 are not elastically stretchable in a vertical direction of the diaper 1. While the topsheet 31 and the backsheet 32 are identical with each other so far as their widths are concerned, the backsheet 32 is relatively long and extends outwards beyond the longitudinally opposite ends 46, 47 of the topsheet 31 to define suspender flaps 51, 52. These suspender flaps 51, 52 are folded along the first folding lines 23A, 23B lying relatively near the center line C-C of the diaper 1 and along the second folding lines 24A, 24B lying relatively remote from the center line C-C so as to form pleats. Distal ends 53, 54 of the suspender flaps 51, 52 are joined to the second elastic sheet 30 in the proximity of the peripheral edges 11 of the waist-opening 10 by means of hot melt adhesive 57 (See Fig. 4).

[0015] In the case of such diaper 1, the pleats of the suspender flaps 51, 52 are flattened out as the cover component 2 is pulled upwards, so that the desired elastic stretching of the cover component 2 is not obstructed. With this diaper 1, the suspender flaps 51, 52 of the absorbent component 3 function in the same manner as the suspender sheets 22A, 22B shown in Figs. 2 and 3. Substantially the same effect as the effect offered by the diaper 1 of Figs. 1 - 3 can be achieved when a pair of non-stretchable sheets are used as the suspender and these sheets are bonded to the cover component 2 as well as to the absorbent component 3.

[0016] To exploit this invention, the suspender sheets 22A, 22B may be made of a woven fabric, a nonwoven fabric, a plastic sheet material or a laminate comprising some of them, all of which are not elastically stretchable in a vertical direction of the diaper 1. The backsheet 32 including the suspender flaps 51, 52 functioning in the same manner as the suspender sheets 22A, 22B may be made of a woven fabric, a nonwoven fabric or a plastic sheet material, all of which are also not elastic stretchable and liquid-impervious. The liquid-pervious topsheet 31 may be made of a nonwoven fabric or an apertured plastic sheet. The first and second elastic sheets 21, 30 forming the cover component 2 may be made of a woven fabric, a nonwoven fabric, a plastic sheet material or a laminate comprising some of them, all of which are elastically stretchable. Bonding of various members may be achieved by utilizing suitable adhesive agents such as hot melt adhesive or heat-sealing

technique.

[0017] The disposable diaper according to the invention basically comprises the cover component having elastic stretchability in a vertical direction of the diaper and the absorbent component which is formed separately of the cover component and not elastically stretchable wherein these two basic components are connected to each other by the suspender sheets being not stretchable and folded so as to form the pleats adapted to be flattened out in a vertical direction of the diaper. This unique arrangement ensures that the desired stretchability as well as contractibility of the cover component in the vertical direction should not be obstructed.

#### Claims

1. A disposable diaper comprising a briefs-type cover component having a front waist region, a rear waist region and a crotch region extending therebetween so as to form a waist-opening and a pair of leg-openings and an absorbent component formed separately of said cover component, said absorbent component comprising a liquid-pervious topsheet, a liquid-impervious backsheet and a liquid-absorbent core disposed therebetween, and said absorbent component longitudinally extending on an inner side of said cover component from said crotch region into said front and rear waist regions, wherein:

said cover component is elastically stretchable in a vertical direction of said diaper;

said absorbent component is not elastically stretchable in said vertical direction and connected to the inner surface of said cover component in the proximity of the waist-opening in said front and rear waist regions by suspender sheets which are not elastically stretchable in said vertical direction; and

said suspender sheets are respectively formed with pleats which extend circumferentially of said waist regions and can be flattened out in said vertical direction.

2. A disposable diaper according to Claim 1, wherein said suspender sheets are formed separately of said cover component.
3. A disposable diaper according to Claim 1, wherein said suspender sheets are formed with a part of said backsheet.
4. A disposable diaper according to Claim 1, wherein said cover component comprises first and second elastic sheets which are placed one upon another and intermittently bonded.
5. A disposable diaper according to Claim 1, wherein

said absorbent component is provided along transversely opposite side edges thereof with elastically stretchable members.

#### Patentansprüche

1. Wegwerfwindel mit einem slip-artigen Abdeck-Bestandteil, der einen vorderen Hüftbereich, einen hinteren Hüftbereich und einen dazwischen verlaufenden Schrittbereich unter Bildung einer Hüftöffnung und eines Paares Beinöffnungen aufweist, und mit einem getrennt von dem Abdeck-Bestandteil ausgebildeten Absorbtiionsbestandteil, der eine flüssigkeitsdurchlässige obere Lage, eine flüssigkeitsundurchlässige hintere Lage und einen dazwischen angeordneten flüssigkeitsabsorbierenden Kern aufweist und sich auf einer Innenseite des Abdeck-Bestandteils vom Schrittbereich in den vorderen und den hinteren Hüftbereich hinein erstreckt, wobei

der Abdeck-Bestandteil in Vertikalrichtung der Windel elastisch dehnbar ist,

der Absorbtiionsbestandteil in Vertikalrichtung nicht elastisch dehnbar ist und mit der Innenfläche des Abdeck-Bestandteils nahe der Hüftöffnung im vorderen und hinteren Hüftbereich durch Aufhängungslagen verbunden ist, die in Vertikalrichtung nicht elastisch dehnbar sind, und

die Aufhängungslagen jeweils mit Falten ausgebildet sind, die in Umfangsrichtung der Hüftbereiche verlaufen und in der genannten Vertikalrichtung geglättet werden können.

2. Wegwerfwindel nach Anspruch 1, wobei die Aufhängungslagen getrennt von dem Abdeck-Bestandteil ausgebildet sind.
3. Wegwerfwindel nach Anspruch 1, wobei die Aufhängungslagen mit einem Teil der hinteren Lage gebildet sind.
4. Wegwerfwindel nach Anspruch 1, wobei der Abdeck-Bestandteil eine erste und eine zweite elastische Lage aufweist, die aufeinander angeordnet und mit Unterbrechungen aneinander befestigt sind.
5. Wegwerfwindel nach Anspruch 1, wobei der absorbierende Bestandteil entlang seiner in Querrichtung einander gegenüberliegenden Seitenkanten mit elastisch dehnbaren Elementen versehen ist.

#### Revendications

1. Couche-culotte à jeter, comprenant un composant d'enveloppe du type slip possédant une région de

ceinture antérieure, une région de ceinture postérieure et une région d'entrejambes s'étendant entre celles-ci, de manière à constituer une ouverture pour la taille et une paire d'ouvertures pour les jambes, et un composant absorbant formé séparément dudit composant d'enveloppe, ledit composant absorbant comprenant une feuille de couverture perméable aux liquides, une feuille postérieure imperméable aux liquides, et une âme absorbant les liquides disposée entre celles-ci, et ledit composant absorbant s'étendant longitudinalement sur un côté intérieur dudit composant d'enveloppe, de ladite région d'entrejambes dans lesdites régions antérieure et postérieure de ceinture, dans laquelle :

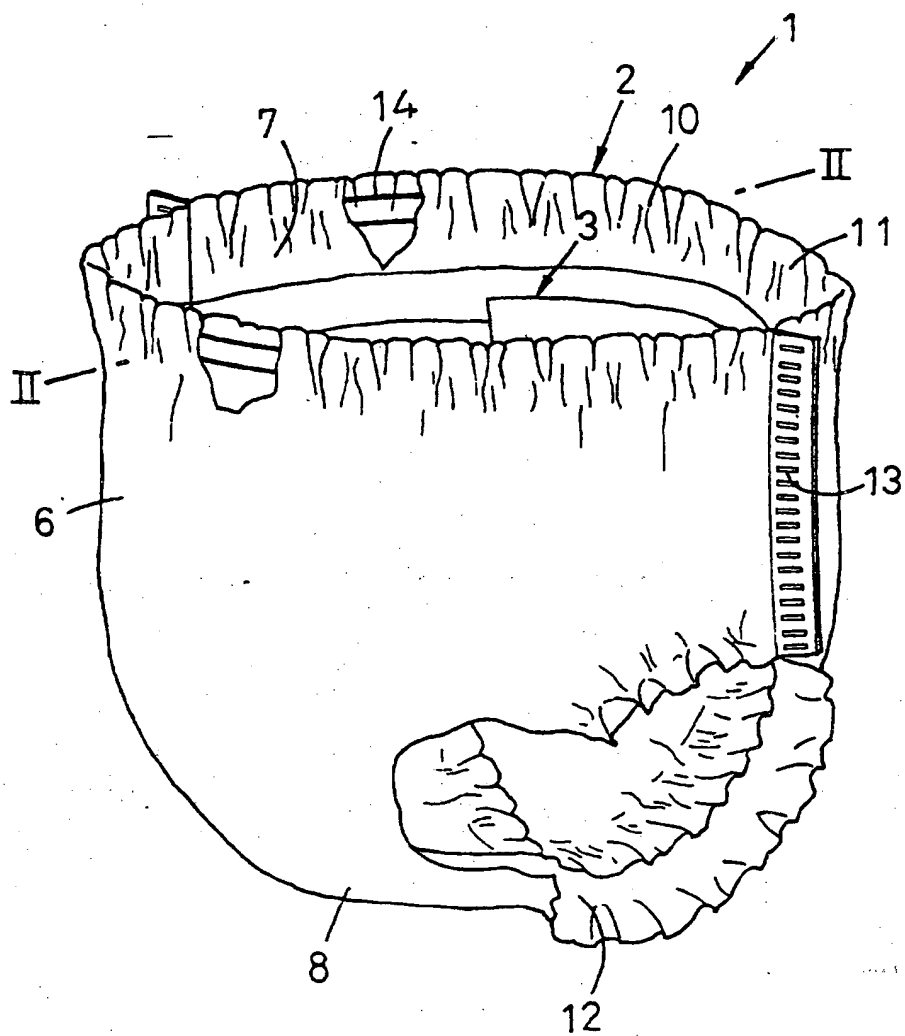
ledit composant d'enveloppe est élastiquement étirable dans une direction verticale de ladite couche ;

ledit composant absorbant n'est pas élastiquement étirable dans ladite direction verticale et est relié à la surface intérieure dudit composant d'enveloppe dans le voisinage de l'ouverture de taille dans lesdites régions antérieure et postérieure de ceinture par des feuilles de suspension qui ne sont pas élastiquement étirables dans ladite direction verticale ; et

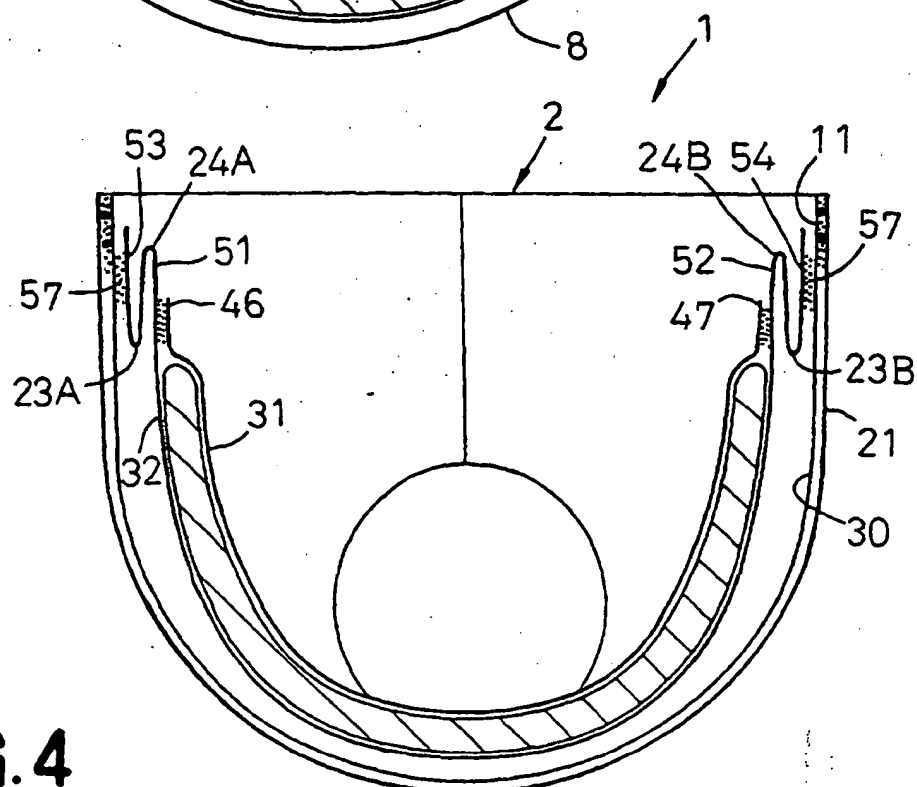
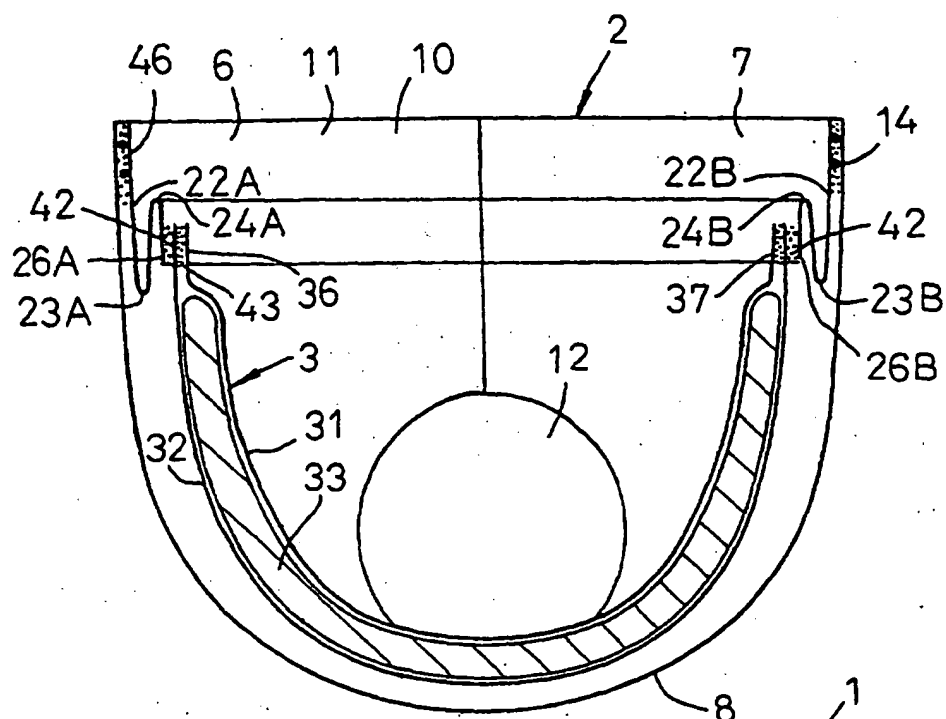
lesdites feuilles de suspension sont respectivement constituées à l'aide de plis, qui s'étendent à la périphérie desdites régions de ceinture et qui peuvent être aplatis dans ladite direction verticale.

2. Couche-culotte à jeter selon la revendication 1, dans laquelle lesdites feuilles de suspension sont formées séparément sur ledit composant d'enveloppe.
3. Couche-culotte à jeter selon la revendication 1, dans laquelle lesdites feuilles de suspension sont formées au moyen d'une partie de ladite feuille postérieure.
4. Couche-culotte à jeter selon la revendication 1, dans laquelle ledit composant d'enveloppe comprend une première et une deuxième feuilles élastiques qui sont placées l'une sur l'autre et collées par intermittence.
5. Couche-culotte à jeter selon la revendication 1, dans laquelle ledit composant absorbant est prévu le long des bords latéraux transversalement opposés de celle-ci avec des éléments élastiquement étirables.

FIG. I

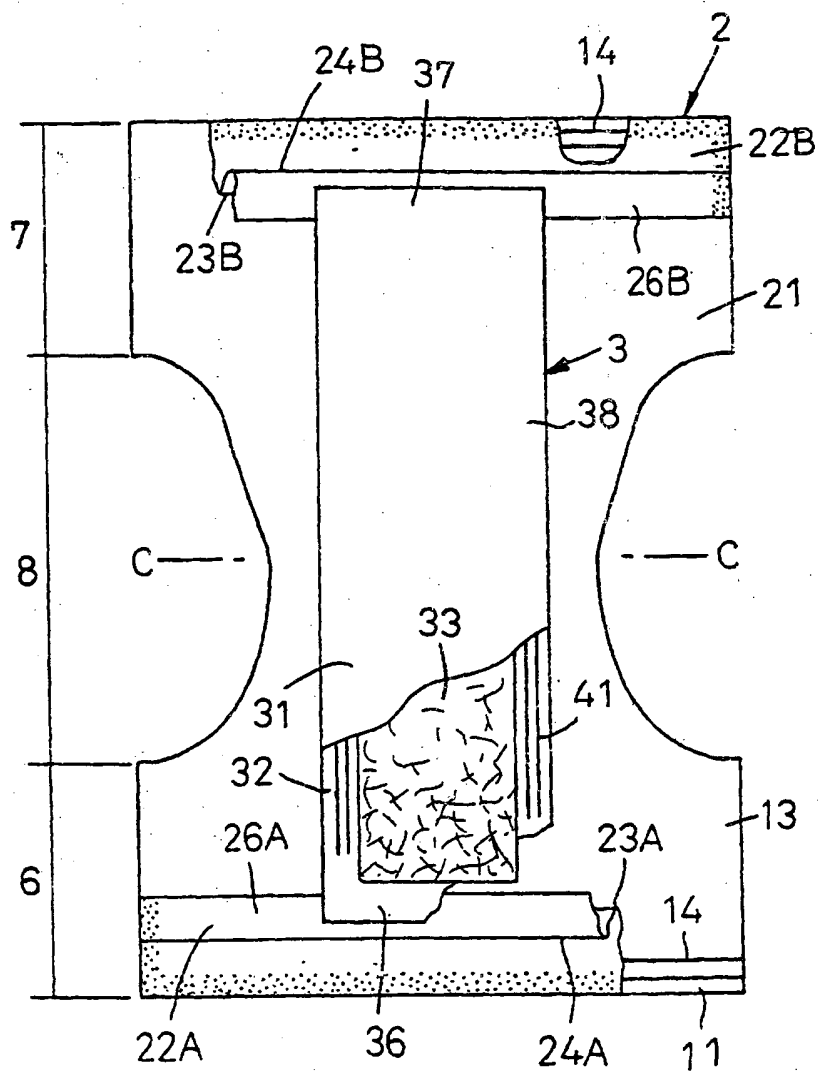


**FIG.2**

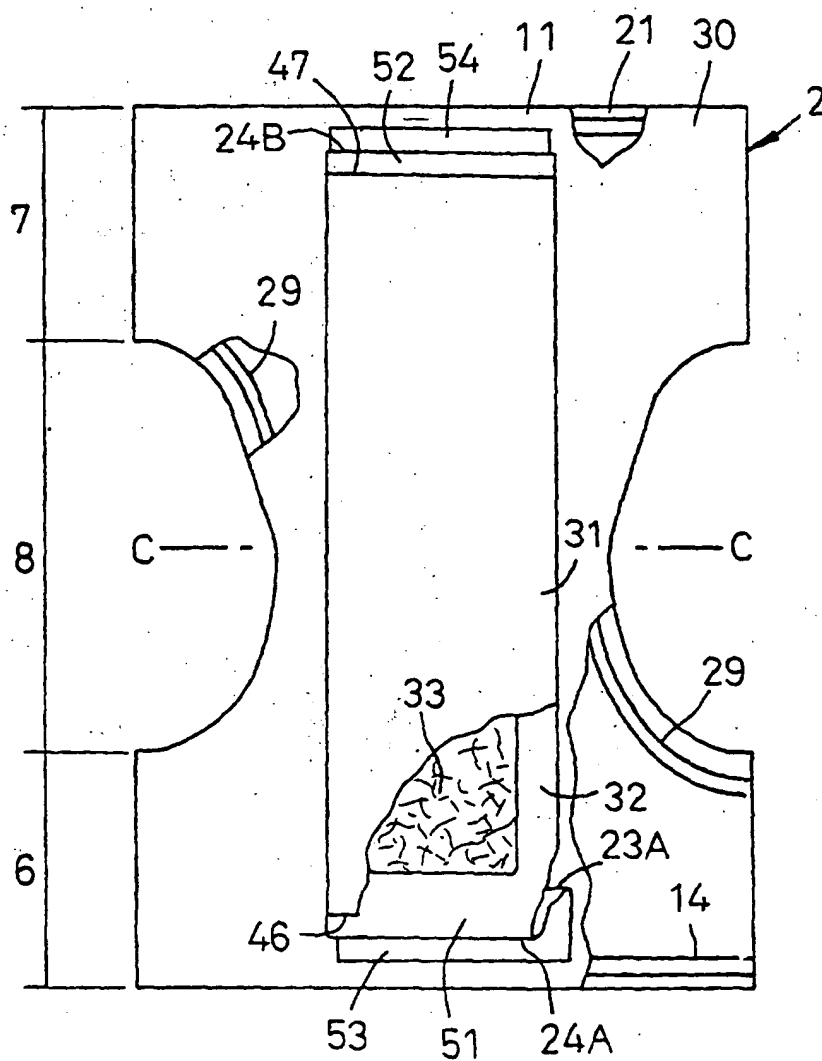


**FIG.4**

**FIG. 3**



**FIG. 5**



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